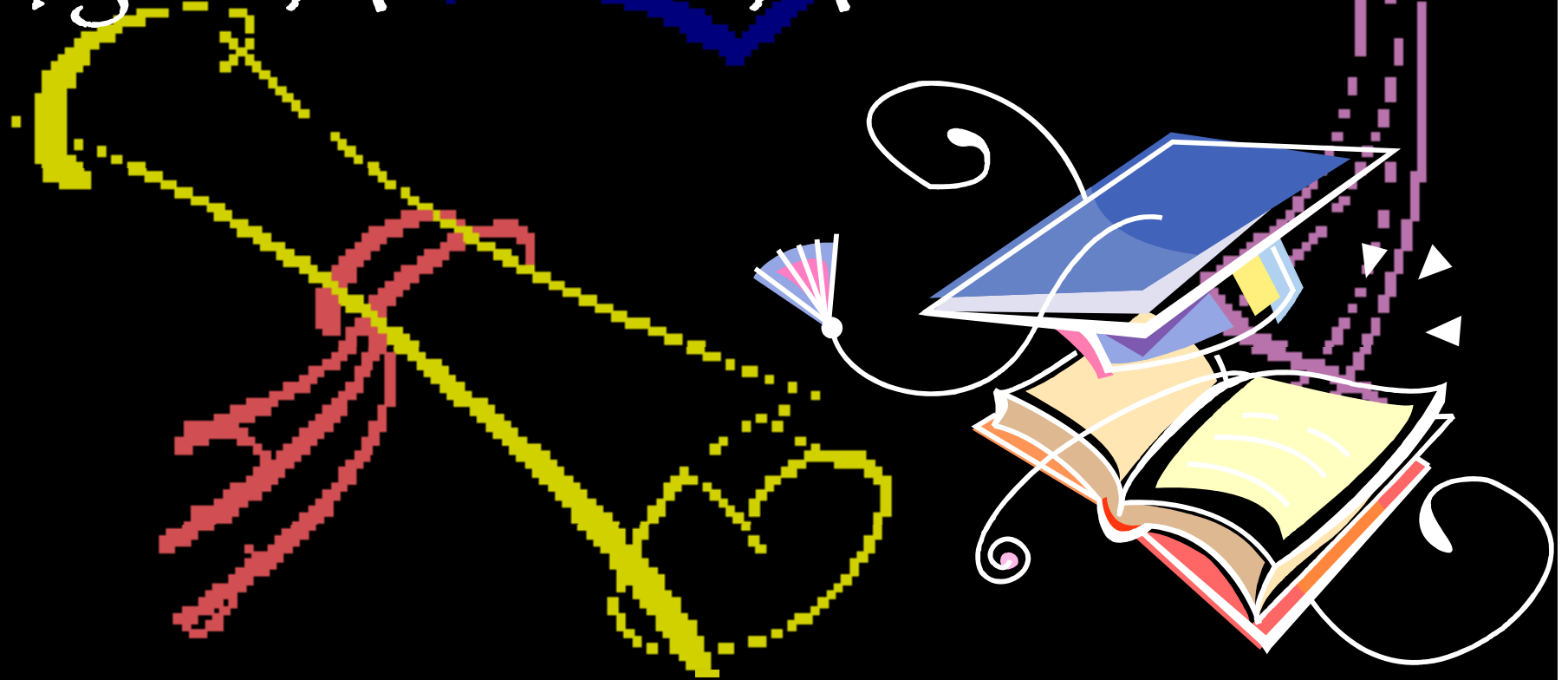


Gouge, Fournier, Snyder,
Stock, Foss, Lanier,
Latchininsky,
Gebre-Amlak.

School IPM



Healthier Environment ~>
Healthier Kids ~>
Higher Academic Achievement



No



Allowed

Children K-12 spend 6-7 hours a day,
5 days a week,
180 days a year, in school.



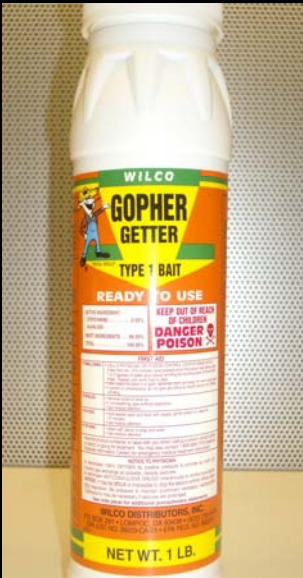
Younger children in child care facilities
often spend 9 hours a day,
5 days a week,
250 days a year.

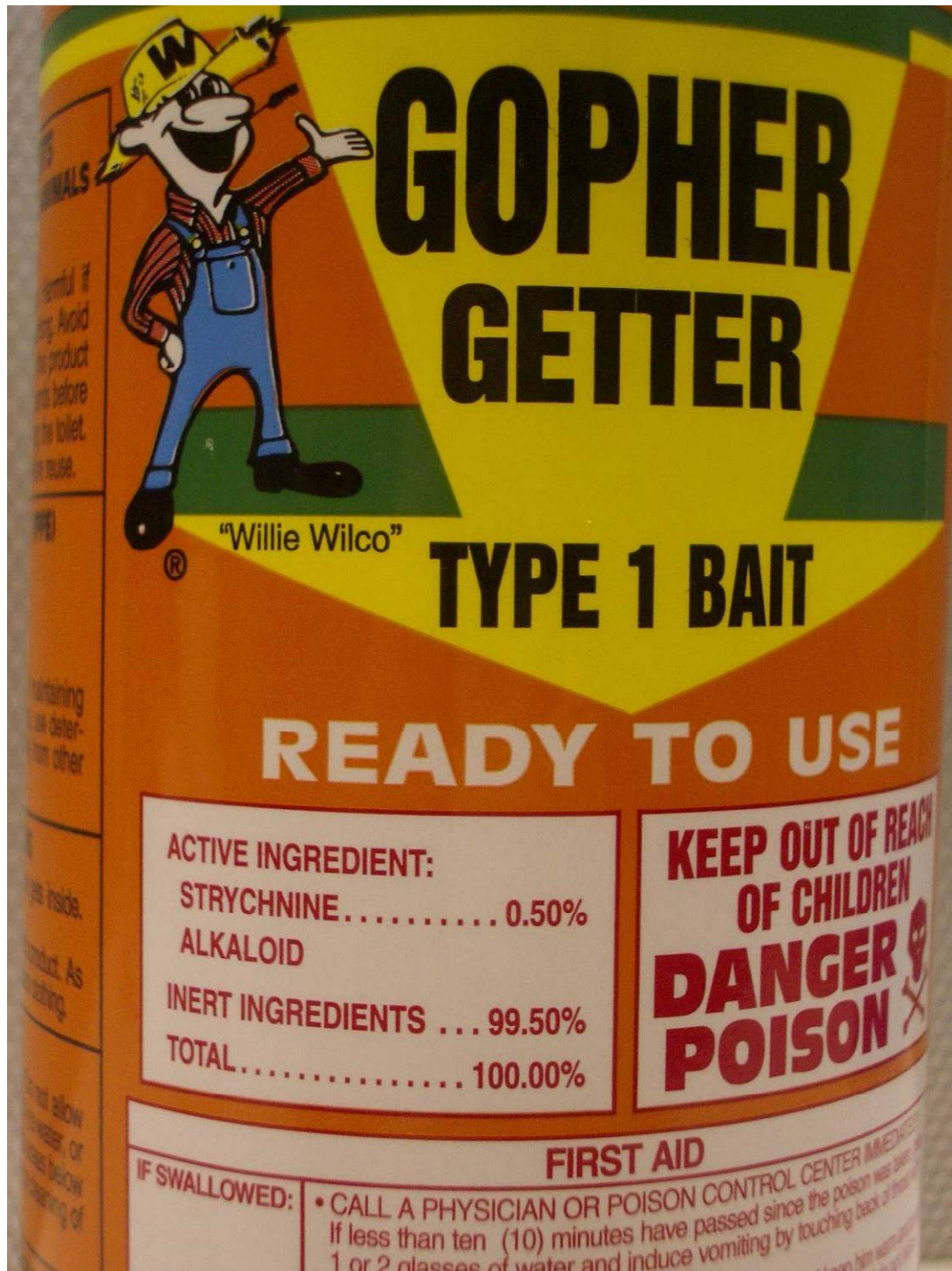


Triage risk factors



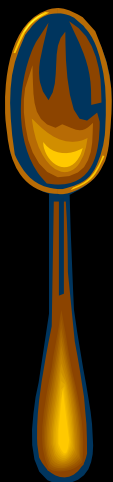
Homo sapiens!







26 4 year-olds



52 toddlers

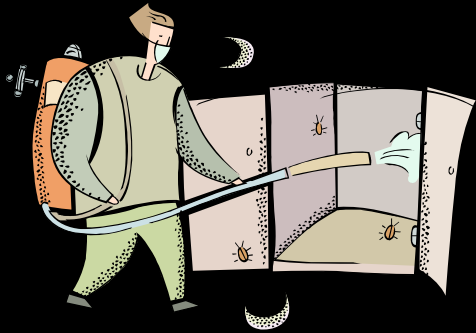


Raid® Ant Killer

¡Libérese de las hormigas!







MAKES UP TO
274 GALLONS OF SPRAY



OUTDOOR
USE ONLY

The National Academy of Sciences 1993
landmark report
*Pesticides in the Diets of Infants
and Children*



estimates
that

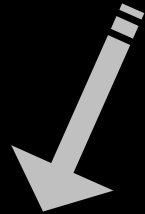
50%

of lifetime pesticide exposure
occurs during the first five years
of life...

CHILDREN ARE NOT LITTLE ADULTS...

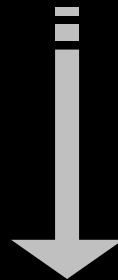
Children are still

1) Growing



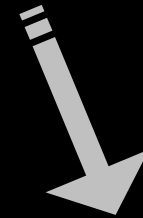
Greater Metabolic
Demands

&



Anatomic &
Physiological
Differences

2) Developing



Behavior
Differences

Jonathan Lee-Melk MD

Metabolic Differences:

Diet & Dietary Requirements are Greater

Per Unit of Body Weight:

⇒ Children eat more food than an adult

✧ A newborn requires about 140 kcal/kg/day

An adult man requires about 43 kcal/kg/day

✧ A 1 year old infant consumes three times as many calories per unit of body weight than an adult.

GREATER EXPOSURE
TO PESTICIDES!

Metabolic Differences:

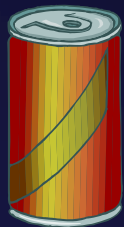
Fluid Requirements are Greater

Per Unit of Body Weight:

Children drink more fluids than adults

⇒ The average newborn consumes about 5 oz of breast milk or formula per kilogram of body weight.

★ For the average adult male, this is equivalent to drinking 30 12 oz. cans of soda per day!



X 30 !!!

GREATER EXPOSURE
TO PESTICIDES!

Metabolic Differences:

Oxygen Requirements are Greater

Per Unit of Body Weight:

Children breath more air than adults

Newborn:
60 breaths/ min.

>

Child 1-4 years
old:
35 breaths/ min.

>

Adult:
20 breaths/ min.

A newborn's minute ventilation
is approximately 400mL/min/kg

>

An adult's minute ventilation is
approximately 150mL/min/kg

Children also breath *different* air than adults!

★ The breathing zone for an adult
is typically 4 to 6 feet above the
floor

★ The breathing zone for a child depends
on their height and mobility...

GREATER EXPOSURE
TO PESTICIDES!

Anatomy & Physiology Differences:

Distribution & Clearance of Toxins are Different

Children have:

⇒ Higher proportion of Total Body Water/kg

⇒ Less body fat/kg

✦ Higher circulating levels
of lipophylic pesticides

Renal clearance varies by age

⇒ May lead to higher levels of
toxins or their metabolites



Anatomy & Physiology Differences: Distribution & Clearance of Toxins are Different

⇒ Organs & tissues (including the central nervous system, kidneys, liver, lungs, eyes, reproductive system) continue to differentiate and mature throughout infancy, childhood, and, in some cases, adolescence...



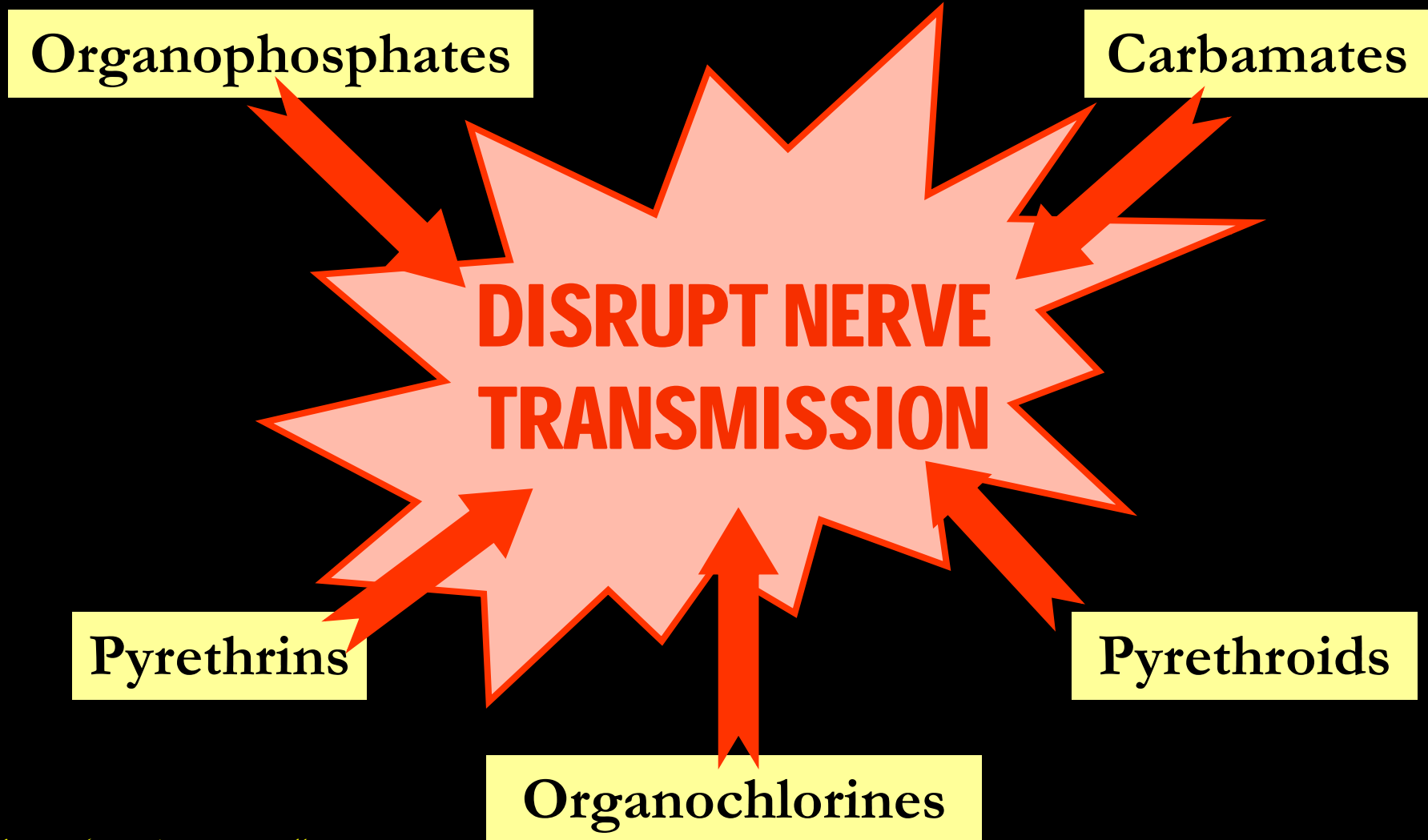
Example: The Developing Brain...

- ⇒ Neuronal development, migration, and myelination **occur rapidly** during the first 2 years of life
- ⇒ The **blood-brain barrier** is 'leaky', allowing chemicals access to the brain
- ⇒ The **brain** continues to markedly **develop and grow** throughout childhood and adolescence

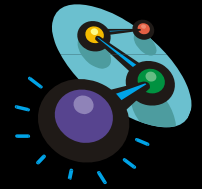
Bearer
Claudio, et. al.

Disruption of this process can have
profound effects
on essential elements of development

Most insecticides function as neurotoxins...



- > Asthma is the most common chronic illness in children
 - (4.8 million kids - U.S.
 - (Most exacerbations are due to environmental triggers



> 1 in 6 kids in the U.S. has a recognized developmental disability

- (Learning disability
- (Emotional challenges
- (Behavioral disorder



B Both pest related allergens and chemical neurotoxins aggravate problems.

Inspect from a pest's perspective



Kitchen Problems







Sanitation







Pest Proofing Problems



Evidence of Clutter Bugs





Custodial Closets





Food Storage



Waste Management



Turkestan Cockroach

Male



Female



American Cockroach





*Solenopsis
xyloni*

Southern
Fire ant





Mosquitoes



Enough for everyone to enjoy

Flooded School Play



Health Office



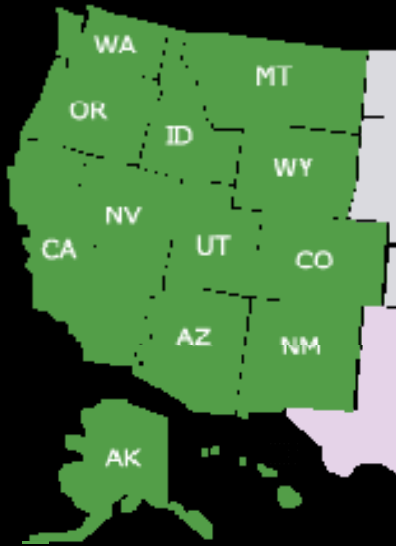


- & No scheduled pesticidal sprays
- & Inspect and monitor
 - Pest Proofing = exclusion, habitat modification
 - Sanitation = nothing to eat, no where to live
- & Restrict the pesticides allowed, and only certified personnel can apply pesticides
- & Inform clients
- & Professionals are educators and diagnosticians

Green Results in AZ K-12

- 3 Significantly better pest management levels
 - 3 Fewer pest sightings
 - 3 More effective remediation
 - 3 Sustainable
- 3 Significantly less pesticide use
 - 3 Fewer applications
 - 3 More specific application
- 3 Significantly improved IAQ
- 3 Significantly reduced RISK

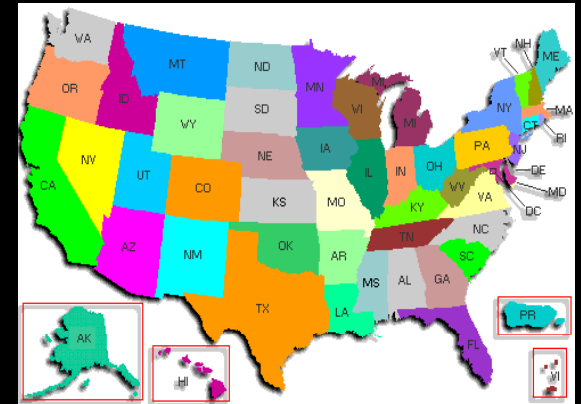




Western
IPM
Center

- (10 of 13 states in
IPM Working
Group
- (AZ, OR, WA, WY, CO,
UT, CA, NV, MT, IL.





(4 IPM center
working groups

(National PMSP

http://www.ipminstitute.org/School_IPM_PMSP.htm



1979 Surgeon General's Report on Health Promotion and
Disease Prevention remarked:

**"There is virtually no major
chronic disease to which
environmental factors
do not contribute...
either directly or indirectly."**



ENVIRONMENTAL WORKING GROUP

THE POWER OF INFORMATION



Body Burden

The Pollution in People

Body Burden

The Pollution in Newborns

A benchmark investigation of industrial chemicals, pollutants, and pesticides in human umbilical cord blood

10 newborn
babies



Born in U.S.
hospitals

Analysis of cord blood samples for **413** chemicals:

- pesticides
- heavy metals
- plastics
- flame retardants
- stain- and grease-proof coatings

287
were
isolated


Average number/newborn = **200** identified chemicals

Lowest = **154**

Highest = **231**

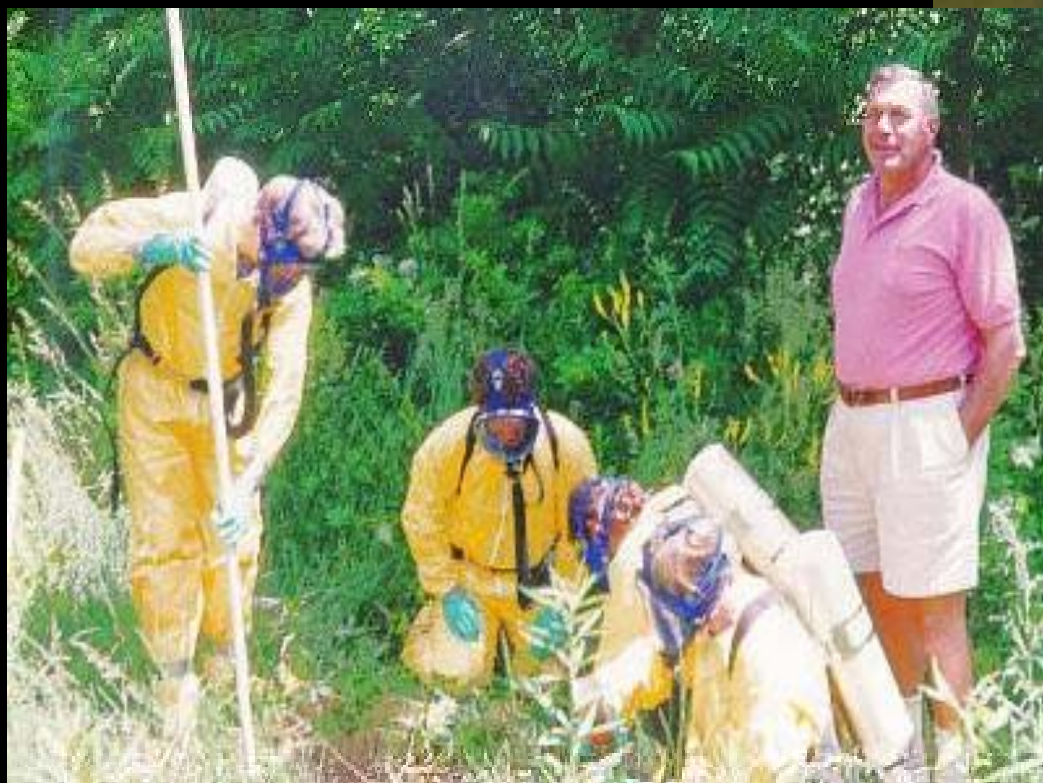
Pesticides

Tetra-pcb
Perfluorochemicals
Nona-pcb
Perfluorochemicals (Pfcs)
Tri-pcb
Pentachlorinated Furan
Chlorinated Dioxins & Furans
Mono-pcb
Polychlorinated Biphenyls
Tribrominated Diphenyl Ether
Polyaromatic Hydrocarbons
Tetrachlorinated Naphthalene
Deca-pcb
Brominated Furans
Hexabrominated Furan
Pentabrominated Diphenyl Ether
Hexachlorinated Dioxin
Octachlorinated Dioxin
Decabrominated Diphenyl Ether
Monochlorinated Naphthalene
Brominated Dioxins
Polychlorinated Naphthalenes
Heptabrominated Diphenyl Ether
Hexabrominated Diphenyl Ether
Hepta-pcb
Heptachlorinated Furan
Octabrominated Diphenyl Ether
Chlorinated Furans
Penta-pcb
Octa-pcb
Metals (Lead, Mercury, Arsenic, Etc.)
Hexa-pcb
Brominated Dioxins & Furans
Pentachlorinated Naphthalene
Tetrabrominated Diphenyl Ether
Polybrominated Diphenyl Ether
Chlorinated Dioxins
Hexabrominated Dioxin
Polybrominated Diphenyl Ether
Hexachlorinated Furan
Hexachlorinated Dioxin
Octachlorinated Naphthalene
Perfluorinated Sulfonate
Tetrabrominated Furan
Pentachlorinated Dioxin
Heptachlorinated Naphthalene
Hexachlorinated Naphthalene
Trichlorinated Naphthalene
Polyaromatic Hydrocarbon
Perfluorinated Carboxylic Acid
Dichlorinated Naphthalene
Heptabrominated Furan



Effects of **multiple and/or
cumulative** exposures to
toxicants and their potential
synergistic effects are

UNKNOWN



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*Children are the most
vulnerable
members of society,
they are the future.
We are the custodians of
their world*



Participants

- **Al Fournier**, Associate Director of the Arizona Pest Management Center (APMC) at the University of Arizona.
- **Jennifer L. Snyder**, School IPM Coordinator for Atrizona.
- **Carrie Foss**, manages IPM certification for landscape and turf in western Washington, Washington State University.
- **Tim Stock** is an IPM Education Specialist for Oregon State University with more than 13 years of experience with governmental and non-governmental organizations, institutes, and UN Agencies addressing community-based approaches to IPM. Tim is currently working on developing an outreach and training program to promote the implementation of IPM in Oregon schools.
- **Will Lanier**, coordinates Urban and/or School IPM Programs for Montana State University. Will is an an Insect Diagnostician and Integrated Crop and Pest Management Assistant.
- **Alexandre V. Latchininsky**, is an extension specialist for University of Wyoming.
- **Assefa Gebre-Amlak**, (Colorado State University) is an extension specialist for Colorado State University.



Participants

- **Collaborators:** Karl Arne (U.S. EPA Region 10); Clark Burgess (Utah Department of Agriculture and Food); Paul Cardosi (Ecolab, Inc.); Jon Carpenter (Nevada Department of Agriculture); Patrick Copps (Orkin, Inc.); William Currie (International Pest Management Institute); Jaslyn Dobrahner (U.S. EPA Region 8); Sherry Glick (U.S. Environmental Protection Agency); Tom Green (IPM Institute of North America, Inc.); Lyndon Hawkins (IPM Professional); Sara Leverette (Oregon Environmental Council); Jack Marlowe (Eden Advanced Pest Technologies, Inc.); Belinda Messenger (California Department of Pesticide Resources); John Scott (Colorado Department of Agriculture); Kyrrha Sevco (Ecology Action); Gregg Smith (Salt Lake City School District).
- **Invited representatives:** Lawrence Graham (Auburn University, Southern IPM in Schools Working Group Director); Faith Oi (Florida University, Southern IPM in Schools Working Group member).



Thank you!

